

## CLAIMS

1. A general computer network controller, preferably operative in a system area network, said controller including a data buffer handling payload and a dedicated, programmable micro sequencer handling control flow and being capable of running different network packets and protocols, being packet format independent and network independent, wherein said micro sequencer is tightly coupled to a fully associative context block for control thereof, said context block being operative to hold a number of last recently used contexts to provide a dynamic resource allocation scheme reflecting run time situations, substantial parts of said contexts being updated by said micro sequencer, by an inbound scheduler and by a network protocol engine.

2. The computer network controller of claim 1, wherein said micro sequencer is operative to control a scalable memory array which can be used as a table for inbound address mapping of registered memory and access protection, and as a means for keeping context information about all active channels.

3. The computer network controller of claim 1, wherein said fully associative context block constitutes a connection between said inbound scheduler and said network protocol engine, thereby giving said network controller the ability to pipeline tasks and execute in parallel.

4. The computer network controller of claim 3, wherein said context block is operative to have contexts dynamically allocated between inbound remote direct memory access, inbound remote memory access and outbound remote memory access, two upper contexts nevertheless being reserved for locally driven remote direct memory access, said context block containing information including the following:

- expected sequence number of the next packet for sequence checking.
- input gathering size in order to optimize use of an attached bus.
- packet type defined by the network for a specific virtual channel,

- accumulated message cyclic redundancy check for data integrity.
- source addresses,
- destination addresses,
- mapping for remote direct memory access operations,
- dedicated flags like page crossing to do new mapping.
- word count zero detection,
- as well as protection tag check,

all these information events from said inbound scheduler, said micro sequencer  
10 and said network protocol engine to be synchronized by said context block and  
used by said micro sequencer to invoke, restart, switch or terminate a thread  
immediately.

5. The computer network controller of claim 1, wherein said micro sequencer is operative to control said network protocol engine which in its turn is operative to perform link injection control, based on feedback from a link layer as well as intervention from an operative system, said network protocol engine further being operative to schedule packets to the network.

20 6. The computer network controller of claim 1, wherein said inbound scheduler is operative to decode, schedule and invoke running tasks or allocate new tasks, based on

- i) packets received from the network,
- ii) memory mapped operation received from a bus attachment module,
- 25 iii) descriptors inserted in work queue fifos by a user application, and
- iv) tasks received from said context block.

7. In a system area network comprising a plurality of host channel adapters, a plurality of target channel adapters and a switching fabric, each respective one of said adapters being constituted by a computer network controller of the type defined in claim 1 together with a bus attachment module and a network link interface.

a method for local and remote asynchronous completion control, in which method as well accumulated message cyclic redundancy check as an address to a remote completion queue, e.g. at a target, are attached, by a said micro sequencer, to a last packet in a message to be sent from a sender, e.g. a host, to a receiver, e.g. a target, whereby, on reception of said packet at said receiver and checking for data integrity for the whole message by a target micro sequencer, "receive complete" is signaled directly from said target micro sequencer in the remote process completion queue, and simultaneously a response is made back to the sender, which will then signal "send complete" and status directly to a local process.

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